IN THE CLAIMS:

Please amend the claims as follows:

1-73. (Canceled)

74. (Currently amended) A method of depositing a composite film with at least one component being a nanostructured material onto a substrate, the method comprising:

(i) forming a suspension of the material in a liquid medium, the nanostructured material comprising at least one of nanotubes and nanowires;

(ii) adding small particles to the suspension to promote adhesion of the nanostructured material to the substrate, wherein the small particles comprise a metal selected from the group consisting of iron, lead, and cobalt;

(iii) selectively adding a charger to the liquid medium;

(iv) immersing electrodes in the suspension, wherein at least one of the electrodes comprises the substrate; and

(v) applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes;

wherein the nanostructured material and the small particles are co-deposited on the substrate to form a composite layer, the composite layer having an intimate mix of the carbon nanotubes and the small particles, wherein the emission current density of the composite layer is greater than 1 A/cm^2.

75. (Previously presented) The method of claim 74, wherein the small particles are metallic and have a diameter less than 1 micrometer.

76. (Previously presented) The method of claim 75, comprising shortening the carbon nanotubes by chemical reaction prior to their introduction into the suspension.

77. (Previously presented) The method of claim 75, comprising:

adding additional materials into the suspension, the additional materials comprising at least one binder material, wherein the binder material is present in an amount ranging from 0.1-20 weight% of the nanostructured material.

78. (Canceled)

79. (Withdrawn) An electrophoretic method of fabricating a carbon nanotube-based electron field emission cathode, the method comprising;

chemically processing carbon nanotubes to improve their dispersion in a liquid medium, the liquid medium comprising water and alcohol,

forming a suspension of the processed carbon nanotubes in the liquid medium;

adding an adhesion-promoting particle and a charger to the said suspension to form an intimate mixture;

immersing a plurality of electrodes in the mixture, wherein at least one of the electrodes comprises a field emission cathode substrate, and

applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes; wherein the carbon nanotubes and the adhesion-promoting particle co-deposit on pre-determined areas on the substrate to form a composite film, the composite film having an intimate mix of the carbon nanotubes and the adhesion-promoting particle; and

annealing the said field emission substrate with the deposited composite film at a pre-determined temperature to activate the adhesion-promoting particle such that they bond with the carbon nanotubes and the substrate.

80. (Withdrawn) The method of claim 79, wherein the step of chemically processing the carbon nanotubes comprises adding chemical groups onto an outer wall of the carbon nanotubes so that they form a stable suspension in an electrophoresis bath.

81. (Withdrawn) The method of claim 79, wherein the step of chemically processing the carbon nanotubes comprises shortening a length of the carbon nanotubes to a range of 1 to 10 micrometers

82. (Withdrawn) The method of claim 79, wherein a thickness of the composite film deposited on the substrate surface is in a range of 1 to 20 micrometers.

83. (Withdrawn) A carbon nanotube-based field emission cathode fabricated by the method of claim 79.

84. (Withdrawn) The carbon nanotube-based field emission cathode of claim 83, wherein the carbon nanotube-based field emission cathode has a field emission current density of 0.01mA/cm^2 or higher at an applied electrical field of 1 MV/micrometer or lower.

85. (Withdrawn) The method of claim 79, wherein the adhesion-promoting particle comprises small particles with a diameter less than 1 micrometer.

86. (Withdrawn) An electrophoretic method of fabricating a carbon nanotube-based electron field emission cathode, the method comprising;

chemically processing carbon nanotubes to improve their dispersion in a medium of water and alcohol medium;

forming a suspension of the processed carbon nanotubes in the medium;

adding an adhesion-promoting particle and a charger to the said suspension to form an intimate mixture;

immersing electrodes in the mixture, wherein at least one of the electrodes comprises the field emission cathode substrate; and

applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes; wherein the carbon

nanotubes and the adhesion-promoting particle co-deposit on pre-determined areas on the substrate to form a composite layer, the composite layer having an intimate mix of the carbon nanotubes and the adhesion-promoting particle; and

annealing the said field emission substrate with the deposited composite layer at a pre-determined temperature to activate the adhesion-promoting materials such that they bond with the carbon nanotubes and the substrate.

87. (Withdrawn) The method of claim 86, wherein the step of chemically processing the carbon nanotubes comprises adding chemical groups onto an outer wall of the carbon nanotube so that they form a stable suspension in an electrophoresis bath.

88. (Withdrawn) The method of claim 86, wherein the step of chemically processing the carbon nanotubes comprises shortening a length of the carbon nanotubes to a range of 1 to 10 micrometers.

89. (Withdrawn) The method of claim 86, wherein a thickness of the composite layer deposited on the substrate surface is in a range of 1 to 20 micrometers.

90. (Withdrawn) A carbon nanotube-based field emission cathode fabricated by the method of claim 86.

91. (Withdrawn) The carbon nanotube-based field emission cathode of claim 90, wherein the carbon nanotube-based field emission cathode has a field emission current density of 0.01mA/cm^2 or higher at an applied electrical field of 1.4V/micrometer or lower.

92. (Withdrawn) The method of claim 86, wherein the method further comprises the following steps:

placing a mask on a surface of the cathode substrate, the mask having multiple openings through which areas of the cathode substrate are exposed to the mixture;

applying a direct current between the electrodes such that the mixture containing the carbon nanotubes and the adhesion promoting materials co-deposit onto the exposed cathode substrate areas; and

removing the mask without removing the composite layer.

93. (Withdrawn) The method of claim 92, wherein the mask comprises a layer of developed photoresist.

94. (Withdrawn) The method of claim 86, wherein the field emission cathode has a triode structure with a substrate, a dielectric insulating layer and a conducting layer; wherein the dielectric layer and the conducting layer have multiple openings through which areas of the cathode substrate are exposed.

95. (Withdrawn) The method of claim 94, wherein a bias voltage is applied to the conducting layer during the electrophoretic deposition to prevent deposition of the carbon nanotubes on a surface of the conducting layer and to enable deposition of onto the exposed areas of the substrate.

96. (Withdrawn) A sequential electrophoretic deposition method of fabricating carbon nanotube-based electron field emission cathodes, the method comprising:

forming multiple electrophoretic baths, wherein the multiple electrophoretic baths include a first bath and a second bath, wherein the first bath is a suspension comprising an adhesion promoting material and a charger in a liquid medium and the second bath is a suspension comprising carbon nanotubes and the charger in a mixture of alcohol and water;

immersing a plurality of electrodes in the first bath, wherein at least one of the electrodes comprises a field emission cathode substrate'

electrophoretically depositing a layer of the adhesion promoting material with a pre-determined thickness onto an exposed area of the cathode surface,

removing the plurality of electrodes from the first bath and immersing the plurality of electrodes in the second bath;

electrophoretically depositing a composite film including the carbon nanotubes on the exposed area of the cathode surface;

optionally repeating the steps of immersing and electrophoretically depositing in the first bath and the second bath; and

annealing the said field emission cathode substrate with the deposited composite film at a pre-determined temperature to activate the adhesion-promoting material such that they bond with the carbon nanotubes and the substrate.

97. (Withdrawn) A carbon nanotube field emission cathode fabricated by the method of claim 96, wherein the cathode has a field emission current density of $0.01mA/cm^2$ or higher at an applied electrical field of 1.4V/micrometer or lower.

98. (Previously presented) A method of depositing a composite layer with at least one component being carbon nanotubes onto a substrate, the method comprising:

(i) forming a suspension containing at least the carbon nanotubes and an adhesion promoting material in a liquid medium, the adhesion promoting material further comprising a carbon-dissolving material selected from the group consisting of nickel, iron, cobalt and manganese;

(ii) selectively adding a charger to the liquid medium;

(iii) immersing electrodes in the suspension, wherein at least one of the electrodes comprises the substrate; and

(iv) applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes;

wherein the carbon nanotubes and the adhesion promoting material co-deposit on the substrate to form the composite layer, the composite layer having an intimate mix of the carbon nanotubes and the adhesion-promoting material.

99. (Previously presented) The method of claim 98 wherein the method further comprises shortening the length of the carbon nanotubes prior to their introduction into the suspension to improve the dispersion and stability of the suspension.

100. (Previously presented) The method of claim 99, wherein the method further comprises annealing the carbon nanotubes at 100°C - 1200°C in a vacuum prior to their introduction into the suspension.

101. (Previously presented) The method of claim 98, wherein step (i) further comprises either application of ultrasonic energy or stirring, thereby facilitating the formation of a stable suspension.

102. (Previously presented) The method of claim 98, wherein the charger comprises at least one of magnesium chloride, $Mg(NO_3)_2$, $La(NO_3)_3$, $Y(NO_3)_3$, $AlCl_3$, and sodium hydroxide.

103. (Currently amended) The method of claim 98 wherein the liquid medium comprises alcohol, and step (i) further comprises forming the suspension having a concentration of [[01]]0.1-1.0 mg/mL, expressed as mg of carbon nanotubes per mL of liquid medium.

104. (Previously presented) The method of claim 98, wherein step (iv) comprises applying direct current to the electrodes.

105. (Previously presented) The method of claim 104, wherein step (iv) comprises creating an electrical field between the electrodes of at least 20V/cm in intensity.

106. (Previously presented) The method of claim 98, further comprising the steps of:

(v) removing the electrodes from the suspension; and

(vi) annealing the coated substrate.

107. (Currently amended) The method of claim 106, wherein step (vi) comprises a two-step anneal, comprising heating the coated substrate to a first temperature for a first selected period of time, then heating the coated ~~electrode~~ substrate to a second temperature for a second selected period of time.

108. (Previously presented) The method of claim 98, wherein step (i) further comprises adding additional materials into the suspension.

109. (Previously presented) The method of claim 108, wherein the additional materials comprise at least one binder material, wherein the binder material is present in an amount ranging from 0.1-20 weight% of the carbon nanotubes.

110. (Previously presented) The method of claim 109, wherein the binder material is at least one of poly(vinyl butyral-co-vinyl alcohol-co-vinyl acetate) and poly(vinylidene fluoride).

111. (Previously presented) The method of claim 98 wherein the adhesion promoting material comprises small particles and wherein the particles have a diameter less than 1 micrometer.

112. (Previously presented) The method of claim 98, comprising:

providing the substrate with a first surface having a mask disposed thereon, the mask having openings through which areas of the first surface are exposed;

immersing the at least one electrode and the masked substrate in the suspension;

applying the direct or alternating current to the electrode and the masked substrate thereby creating an electrical field therebetween, the carbon nanotubes and the adhesion promoting material being caused to migrate toward, and attach to, those exposed areas on the first surface of the substrate; and

removing the mask;

wherein a pattern of the composite layer is deposited onto the substrate.

113. (Previously presented) A method of depositing a composite layer with at least one component being carbon nanotubes onto a substrate, the method comprising:

(i) forming a suspension containing at least the carbon nanotubes and an adhesion promoting material in a liquid medium, the adhesion promoting material further comprising a carbide-forming material selected from the group consisting of tantalum, niobium, vanadium, and hafnium;

(ii) selectively adding a charger to the liquid medium;

(iii) immersing electrodes in the suspension, wherein at least one of the electrodes comprises the substrate; and

(iv) applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes;

wherein the carbon nanotubes and the adhesion promoting material co-deposit on the substrate to form the composite layer, the composite layer having an intimate mix of the carbon nanotubes and the adhesion-promoting material.

114. (Previously presented) The method of claim 113 wherein the method further comprises shortening the length of the carbon nanotubes prior to their introduction into the suspension to improve the dispersion and stability of the suspension.

115. (Previously presented) The method of claim 114, wherein the method further comprises annealing the carbon nanotubes at 100°C - 1200°C in a vacuum prior to their introduction into the suspension.

116. (Previously presented) The method of claim 113, wherein step (i) further comprises either application of ultrasonic energy or stirring, thereby facilitating the formation of a stable suspension.

117. (Previously presented) The method of claim 113, wherein the charger comprises at least one of magnesium chloride, $Mg(NO_3)_2$, $La(NO_3)_3$, $Y(NO_3)_3$, $AlCl_3$, and sodium hydroxide.

118. (Currently amended) The method of claim 113 wherein the liquid medium comprises alcohol, and step (i) further comprises forming the suspension having a concentration of [[01]]<u>0.1</u>-1.0 mg/mL, expressed as mg of carbon nanotubes per mL of liquid medium.

119. (Previously presented) The method of claim 113, wherein step (iv) comprises applying direct current to the electrodes.

120. (Previously presented) The method of claim 119, wherein step (iv) comprises creating an electrical field between the electrodes of at least 20V/cm in intensity.

121. (Previously presented) The method of claim 113, further comprising the steps of:

(v) removing the electrodes from the suspension; and

(vi) annealing the coated substrate.

122. (Currently amended) The method of claim 121, wherein step (vi) comprises a two-step anneal, comprising heating the coated substrate to a first

temperature for a first selected period of time, then heating the coated ~~electrode~~ substrate to a second temperature for a second selected period of time.

123. (Previously presented) The method of claim 113, wherein step (i) further comprises adding additional materials into the suspension.

124. (Previously presented) The method of claim 123, wherein the additional materials comprise at least one binder material, wherein the binder material is present in an amount ranging from 0.1-20 weight% of the carbon nanotubes.

125. (Previously presented) The method of claim 124, wherein the binder material is at least one of poly(vinyl butyral-co-vinyl alcohol-co-vinyl acetate) and poly(vinylidene fluoride).

126. (Previously presented) The method of claim 113 wherein the adhesion promoting material comprises small particles and wherein the particles have a diameter less than 1 micrometer.

127. (Previously presented) The method of claim 113, comprising:

providing the substrate with a first surface having a mask disposed thereon, the mask having openings through which areas of the first surface are exposed;

immersing the at least one electrode and the masked substrate in the suspension;

applying the direct or alternating current to the electrode and the masked substrate thereby creating an electrical field therebetween, the carbon nanotubes and the adhesion promoting material being caused to migrate toward, and attach to, those exposed areas on the first surface of the substrate; and

removing the mask;

wherein a pattern of the composite layer is deposited onto the substrate.

128. (Previously presented) A method of depositing a composite layer with at least one component being carbon nanotubes onto a substrate, the method comprising:

(i) forming a suspension containing at least the carbon nanotubes and an adhesion promoting material in a liquid medium, the adhesion promoting material further comprising a binder selected from the group consisting of poly(vinyl butyral-co-vinyl alcohol-co-vinyl acetate) and poly(vinylidene fluoride);

(ii) selectively adding a charger to the liquid medium;

(iii) immersing electrodes in the suspension, wherein at least one of the electrodes comprises the substrate; and

(iv) applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes;

wherein the carbon nanotubes and the adhesion promoting material co-deposit on the substrate to form the composite layer, the composite layer having an intimate mix of the carbon nanotubes and the adhesion-promoting material.

129. (Previously presented) The method of claim 128 wherein the method further comprises shortening the length of the carbon nanotubes prior to their introduction into the suspension to improve the dispersion and stability of the suspension.

130. (Previously presented) The method of claim 129, wherein the method further comprises annealing the carbon nanotubes at 100°C - 1200°C in a vacuum prior to their introduction into the suspension.

131. (Previously presented) The method of claim 128, wherein step (i) further comprises either application of ultrasonic energy or stirring, thereby facilitating the formation of a stable suspension.

132. (Previously presented) The method of claim 128, wherein the charger comprises at least one of magnesium chloride, $Mg(NO_3)_2$, $La(NO_3)_3$, $Y(NO_3)_3$, $AlCl_3$, and sodium hydroxide.

133. (Currently amended) The method of claim 128 wherein the liquid medium comprises alcohol, and step (i) further comprises forming the suspension having a concentration of [[01]]<u>0.1</u>-1.0 mg/mL, expressed as mg of carbon nanotubes per mL of liquid medium.

134. (Previously presented) The method of claim 128, wherein step (iv) comprises applying direct current to the electrodes.

135. (Previously presented) The method of claim 134, wherein step (iv) comprises creating an electrical field between the electrodes of at least 20V/cm in intensity.

136. (Previously presented) The method of claim 128, further comprising the steps of:

(v) removing the electrodes from the suspension; and

(vi) annealing the coated substrate.

137. (Currently amended) The method of claim 136, wherein step (vi) comprises a two-step anneal, comprising heating the coated substrate to a first temperature for a first selected period of time, then heating the coated ~~electrode~~ <u>substrate</u> to a second temperature for a second selected period of time.

138. (Previously presented) The method of claim 128, wherein step (i) further comprises adding additional materials into the suspension.

139. (Previously presented) The method of claim 128, wherein the binder is present in an amount ranging from 0.1-20 weight% of the carbon nanotubes.

140. (Previously presented) The method of claim 128 wherein the adhesion promoting material comprises small particles and wherein the particles have a diameter less than 1 micrometer.

141. (Previously presented) The method of claim 128, comprising:

providing the substrate with a first surface having a mask disposed thereon, the mask having openings through which areas of the first surface are exposed;

immersing the at least one electrode and the masked substrate in the suspension;

applying the direct or alternating current to the electrode and the masked substrate thereby creating an electrical field therebetween, the carbon nanotubes and the adhesion promoting material being caused to migrate toward, and attach to, those exposed areas on the first surface of the substrate; and

removing the mask;

wherein a pattern of the composite layer is deposited onto the substrate.

142. (Currently amended) A method of depositing a layer with at least one component being carbon nanotubes onto a substrate, the method comprising:

(i) forming a suspension containing at least the carbon nanotubes;

(ii) selectively adding a charger to the liquid medium;

(iii) immersing electrodes in the suspension, wherein at least one of the electrodes comprises the substrate; and

(iv) applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes;

(v) removing the electrodes from the suspension; and

(vi) annealing the coated substrate in a two-step annealing process, said two-step annealing process comprising heating the coated substrate to a first temperature for a first selected period of time, then heating the

coated ~~electrode~~substrate to a second temperature for a second selected period of time;

wherein the carbon nanotubes deposit on the substrate to form the layer.

143. (Previously presented) The method of claim 142 wherein the first temperature is 100-1200°C, the first selected period of time is approximately one hour, the second temperature is approximately 800°C, and the second selected period of time is approximately two hours.

144. (Previously presented) The method of claim 142 wherein the two-step annealing process is done in a vacuum.

145. (Previously presented) The method of claim 144, wherein the vacuum is of approximately 5×10^{-7} torr.

146. (Previously presented) The method of claim 142 wherein the method further comprises shortening the length of the carbon nanotubes prior to their introduction into the suspension to improve the dispersion and stability of the suspension.

147. (Previously presented) The method of claim 146, wherein the method further comprises annealing the carbon nanotubes at 100°C - 1200°C in a vacuum prior to their introduction into the suspension.

148. (Previously presented) The method of claim 142, wherein step (i) further comprises either application of ultrasonic energy or stirring, thereby facilitating the formation of a stable suspension.

149. (Previously presented) The method of claim 142, wherein the charger comprises at least one of magnesium chloride, $Mg(NO_3)_2$, $La(NO_3)_3$, $Y(NO_3)_3$, $AlCl_3$, and sodium hydroxide.

150. (Currently amended) The method of claim 142 wherein the liquid medium comprises alcohol, and step (i) further comprises forming the suspension having a concentration of [[01]]<u>0.1</u>-1.0 mg/mL, expressed as mg of carbon nanotubes per mL of liquid medium.

151. (Previously presented) The method of claim 142, wherein step (iv) comprises applying direct current to the electrodes.

152. (Previously presented) The method of claim 151, wherein step (iv) comprises creating an electrical field between the electrodes of at least 20V/cm in intensity.

153. (Previously presented) The method of claim 142, wherein step (i) further comprises adding additional materials into the suspension.

154. (Previously presented) The method of claim 153, wherein the additional materials comprise at least one binder material, wherein the binder material is present in an amount ranging from 0.1-20 weight% of the carbon nanotubes.

155. (Previously presented) The method of claim 154, wherein the binder material is at least one of poly(vinyl butyral-co-vinyl alcohol-co-vinyl acetate) and poly(vinylidene fluoride).

156. (Previously presented) The method of claim 142, comprising:

providing the substrate with a first surface having a mask disposed thereon, the mask having openings through which areas of the first surface are exposed;

immersing the at least one electrode and the masked substrate in the suspension;

applying the direct or alternating current to the electrode and the masked substrate thereby creating an electrical field therebetween, the carbon

nanotubes and the adhesion promoting material being caused to migrate toward, and attach to, those exposed areas on the first surface of the substrate; and

removing the mask;

wherein a pattern of the composite layer is deposited onto the substrate.

157. (Currently amended) A method of depositing a layer with at least one component being carbon nanotubes onto a substrate, the method comprising:

(i) forming a suspension containing at least the carbon nanotubes in a liquid medium;

(ii) selectively adding a charger to the liquid medium;

(iii) immersing electrodes in the suspension, wherein at least one of the electrodes comprises the substrate, wherein the substrate is pre-coated with at least one layer of an adhesion-promoting metal selected from the group consisting of titanium, iron, lead, cobalt, nickel, tantalum, tungsten, niobium, zirconium, vanadium, hafnium, ~~cadmium, zinc, and bismuth~~;

(iv) applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes;

wherein the carbon nanotubes deposit on the substrate to form the composite layer having an intimate mix of the carbon nanotubes and the adhesion promoting metal<u>, wherein the emission current density of the composite layer is greater than 1 A/cm^2.</u>

158. (Previously presented) The method of claim 157 wherein the method further comprises shortening the length of the carbon nanotubes prior to their introduction into the suspension to improve the dispersion and stability of the suspension.

159. (Previously presented) The method of claim 158, wherein the method further comprises annealing the carbon nanotubes at 100°C - 1200°C in a vacuum prior to their introduction into the suspension.

160. (Previously presented) The method of claim 157, wherein step (i) further comprises either application of ultrasonic energy or stirring, thereby facilitating the formation of a stable suspension.

161. (Previously presented) The method of claim 157, wherein the charger comprises at least one of magnesium chloride, $Mg(NO_3)_2$, $La(NO_3)_3$, $Y(NO_3)_3$, $AlCl_3$, and sodium hydroxide.

162. (Currently amended) The method of claim 157 wherein the liquid medium comprises alcohol, and step (i) further comprises forming the suspension having a concentration of [[01]]<u>0.1</u>-1.0 mg/mL, expressed as mg of carbon nanotubes per mL of liquid medium.

163. (Previously presented) The method of claim 157, wherein step (iv) comprises applying direct current to the electrodes.

164. (Previously presented) The method of claim 163, wherein step (iv) comprises creating an electrical field between the electrodes of at least 20V/cm in intensity.

165. (Previously presented) The method of claim 157, further comprising the steps of:

(v) removing the electrodes from the suspension; and

(vi) annealing the coated substrate.

166. (Currently amended) The method of claim 165, wherein step (vi) comprises a two-step anneal, comprising heating the coated substrate to a first

temperature for a first selected period of time, then heating the coated ~~electrode~~substrate to a second temperature for a second selected period of time.

167. (Previously presented) The method of claim 157, wherein step (i) further comprises adding additional materials into the suspension.

168. (Previously presented) The method of claim 167, wherein the additional materials comprise at least one binder material, wherein the binder material is present in an amount ranging from 0.1-20 weight% of the carbon nanotubes.

169. (Previously presented) The method of claim 168, wherein the binder material is at least one of poly(vinyl butyral-co-vinyl alcohol-co-vinyl acetate) and poly(vinylidene fluoride).

170. (Previously presented) The method of claim 168 wherein the binder material comprises small particles and wherein the particles have a diameter less than 1 micrometer.

171. (Previously presented) The method of claim 157, comprising:

providing the substrate with a first surface having a mask disposed thereon, the mask having openings through which areas of the first surface are exposed;

immersing the at least one electrode and the masked substrate in the suspension;

applying the direct or alternating current to the electrode and the masked substrate thereby creating an electrical field therebetween, the carbon nanotubes and the adhesion promoting material being caused to migrate toward, and attach to, those exposed areas on the first surface of the substrate; and

removing the mask;

wherein a pattern of the composite layer is deposited onto the substrate.

172. (Currently amended) A method of depositing a composite layer with at least one component being carbon nanotubes onto a substrate, the method comprising:

(i) forming a suspension containing at least the carbon nanotubes and an adhesion promoting material in a liquid medium, said liquid medium comprising dimethyl formamide (DMF);

(ii) selectively adding a charger to the liquid medium;

(iii) immersing electrodes in the suspension, wherein at least one of the electrodes comprises the substrate; and

(iv) applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes;

wherein the carbon nanotubes and the adhesion promoting material co-deposit on the substrate to form the composite layer, the composite layer having an intimate mix of the carbon nanotubes and the adhesion-promoting material, wherein the emission current density of the composite layer is greater than 1 A/cm^2.

173. (Canceled)

Please add the following new claims:

174. (New) The method of claim 98, wherein the emission current density of the composite layer is greater than 1 A/cm^2.

175. (New) The method of claim 113, wherein the emission current density of the composite layer is greater than 1 A/cm^2.

176. (New) The method of claim 128, wherein the emission current density of the composite layer is greater than 1 A/cm^2.

177. (New) The method of claim 142, wherein the emission current density of the layer is greater than 1 A/cm^2.

178. (New) The method of claim 74, wherein the composite layer has a threshold field for emission of less than 1.5 V/micrometer.

179. (New) The method of claim 178, wherein the threshold field is 1.4 V/micrometer.

180. (New) The method of claim 74, wherein the composite layer produces a total emission current greater than 10 mA over a 6 mm^2 area.

181. (New) The method of claim 74, wherein the composite layer produces a pulsed emission current having a pulse frequency higher than 10 KHz.

182. (New) The method of claim 181, wherein the composite layer produces a pulsed emission current having a pulse frequency higher than 100 KHz.

183. (New) The method of claim 74, wherein the composite layer has a total pulsed current over a 6 mm^2 area higher than 10 mA at an electrical field of between 10 and 12 V/micrometer.

184. (New) The method of claim 74, wherein the composite layer produces a stable pulsed current, further wherein the stable pulsed current is higher than 10 mA over a 6 mm^2 area for at least 1,000 pulses.

185. (New) The method of claim 184, wherein the stable pulsed current is higher than 10 mA over a 6 mm^2 area for at least 10,000 pulses.

186. (New) A method of depositing a composite film with at least one component being a nanostructured material onto a substrate, the method

comprising:

(i) forming a suspension of the material in a liquid medium, the nanostructured material comprising at least one of nanotubes and nanowires;

(ii) adding small particles to the suspension to promote adhesion of the nanostructured material to the substrate, wherein the small particles comprise a metal selected from the group consisting of iron, lead, and cobalt;

(iii) selectively adding a charger to the liquid medium;

(iv) immersing electrodes in the suspension, wherein at least one of the electrodes comprises the substrate; and

(v) applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes;

wherein the nanostructured material and the small particles are co-deposited on the substrate to form a composite layer, and further wherein the composite layer;

(a) comprises an intimate mix of the carbon nanotubes and the small particles;

(b) produces an emission current density greater than 1 A/cm^2;

(c) has a threshold field for emission of less than 1.5 V/micrometer; and

(d) produces a total emission current greater than 10 mA over a 6 mm^2 area, a pulsed emission current having a pulse frequency higher than 100 KHz, and a total pulsed current measured over a 6 mm^2 area of greater than 10 mA at between 10 and 12 V/micrometer for at least 1,000 pulses.

187. (New) The method of claim 186, wherein the total pulsed current

measured over a 6 mm^2 area is greater than 10 mA at between 10 and 12 V/micrometer for at least 10,000 pulses.

188. (New) A method of depositing a multilayer coating onto a substrate, the method comprising:

(i) forming a plurality of stable liquid suspensions, wherein each suspension comprises carbon nanotubes and at least one more component selected from a polymer and metal particles;

(ii) selectively adding a charger to each of the plurality of stable liquid suspensions;

(iii) immersing electrodes into one of the plurality of stable liquid suspensions, wherein at least one of the electrodes comprises the substrate;

(iv) applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes, wherein the carbon nanotubes and the at least one other component migrate toward and attach to the substrate to form a composite layer, wherein the applying is for a period of time until a desired thickness of the composite layer is reached;

(v) removing the electrodes from the stable liquid suspension;

(vi) immersing the electrodes into another of the plurality of stable liquid suspensions and repeating steps (iv) and (v); and

(vii) repeating step (vi) until the electrodes have been immersed into each of the plurality of stable liquid suspensions, thereby depositing a multilayer coating onto the substrate.

189. (New) The method of claim 188, further comprising annealing the substrate following the deposition of the multilayer coating.

190. (New) The method of claim 189, wherein the annealing comprises a two-step anneal comprising heating the coated substrate to a first temperature for a first selected period of time and then heating the coated substrate to a second temperature for a second selected period of time.

191. (New) The method of claim 188, wherein the emission current density of the multilayer coating is greater than 1 A/cm^2.

192. (New) A method of depositing a carbon nanotube film having a stable pulsed current higher than 10 mA over a 6 mm^2 area for at least 1,000 pulses, the method comprising:

(i) forming a suspension containing at least the carbon nanotubes and an adhesion promoting material in a liquid medium, the adhesion promoting material comprising one of the group selected from a carbon-dissolving material and a carbide-forming material;

(ii) selectively adding a charger to the liquid medium;

(iii) immersing electrodes in the suspension, wherein at least one of the electrodes comprises the substrate; and

(iv) applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes;

wherein the carbon nanotubes and the adhesion promoting material co-deposit on the substrate to form the composite film, the composite film having an intimate mix of the carbon nanotubes and the adhesion-promoting material, and further wherein the composite film has a stable pulsed current higher than 10 mA over a 6 mm^2 area for at least 1,000 pulses.

193. (New) The method of claim 192, wherein the composite film has a

stable pulsed current higher than 10 mA over a 6 mm^2 area for at least 10,000 pulses.

194. (New) A method of depositing a carbon nanotube film that displays 3% or less emission current decay after 10 hours, the method comprising:

(i) forming a suspension containing at least the carbon nanotubes and an adhesion promoting material in a liquid medium, the adhesion promoting material comprising one of the group selected from a carbon-dissolving material and a carbide-forming material;

(ii) selectively adding a charger to the liquid medium;

(iii) immersing electrodes in the suspension, wherein at least one of the electrodes comprises the substrate; and

(iv) applying a direct or alternating current to the immersed electrodes thereby creating an electrical field between the electrodes;

wherein the carbon nanotubes and the adhesion promoting material co-deposit on the substrate to form the composite film, the composite film having an intimate mix of the carbon nanotubes and the adhesion-promoting material, and further wherein the composite film displays 3% or less emission current decay after 10 hours.

195. (New) An electrophoretic method of depositing a composite film comprising a carbon nanotube material onto a conducting substrate, the method comprising:

(i) forming a liquid suspension comprising the carbon nanotubes, particles of adhesion-promoting material, and a charger, wherein the suspension has a nanotube concentration of 0.1 – 1.0 mg/mL, expressed as mg of single-walled carbon nanotubes per mL of liquid medium;

(ii) immersing electrodes in the suspension, wherein at least

one of the electrodes comprises the substrate;

(iii) applying an electric field in the range of 0.1 – 1000 V/cm between the electrodes, wherein the nanotubes and the particles of adhesion-promoting material co-deposit on the substrate;

(iv) annealing the substrate, wherein the annealing comprises a two-step anneal comprising heating the coated substrate to 100-1200°C for approximately 1 hour and then to approximately 800°C for two hours.

196. (New) A method of depositing a composite film onto one conducting surface of a substrate having at least two electrically insulated conducting surfaces, wherein the composite film comprises carbon nanotubes, the method comprising:

(i) forming a liquid suspension comprising carbon nanotubes and particles of an adhesion promoting material in a liquid medium, wherein the adhesion promoting material is selected from the group consisting of a carbon-dissolving material and a carbide-forming material;

(ii) selectively adding a charger to the liquid medium;

(iii) immersing electrodes in the suspension, wherein at least one of the electrodes comprises the substrate and another of the electrodes comprises a counter electrode, wherein the substrate comprising two electrically insulated conducting surfaces, surface A and surface B; and

(iv) applying an electrical field between surface A and the counter electrode, wherein the field strength is between 0.1-1000 V/cm, thereby causing the carbon nanotubes and the particles of the adhesion promoting material to migrate towards and co-deposit onto surface A;

(v) applying a small bias electrical field on surface B to prevent

deposition of the carbon nanotubes and particles onto surface B.

197. (New) The method of claim 196, wherein surface B is covered by a layer of photoresist.

198. (New) The method of claim 196, further comprising annealing the coated substrate to form a film on surface A, wherein the emission current density of the film is greater than 1 A/cm^2 .

199. (New) The method of claim 76, wherein the shortening comprises etching single walled carbon nanotube bundles in a solution of H_2SO_4 and HNO_3 for a period of time between 10 and 24 hours while the nanotubes are subjected to ultrasonic energy.

200. (New) The method of claim 199, wherein the period of time is 24 hours, and further wherein the etching provides single wall carbon nanotubes having an average bundle length of 0.5 micrometers.